WHAT IS CLAIMED IS:

1. An optical system for projecting an image comprising

   a.) a light source providing a nearly collimated beam of light

   b.) means for converting most of said light into polarized light

   c.) means for rotating the polarization direction of a band of green light of the said polarized light by 90^{0} while leaving the polarization direction of the red and blue lights unchanged, and keeping the propagation directions of all the lights the same

   d.) a polarizing beam splitter that separates the said green band of light from the rest of the light which is magenta in color into two orthogonal propagation directions, having as well orthogonal polarization directions

   e.) a mostly polarization independent dichroic beam splitter that separates the magenta light into a blue and a red beam of light that propagate in two separate directions

   f.) three reflective liquid crystal light valves that reflect respectively red, green and blue lights, thus forming separately red, green and blue images, and

   g.) a projection lens means for projecting the combined red, green and blue lights onto a screen.

2. An optical system as claimed in claim 1 wherein the combination of the polarizing beam splitter and the dichroic beam splitter comprise glass pieces.

3. An optical system as claimed in claim 1 and 2 wherein the polarizing beam splitter comprises a polarizing cube with a coating designed at 45^{0} angle of incidence that transmits p-polarized light and reflects s-polarized light.

4. An optical system as claimed in claim 1 or 2 wherein the said dichroic beam splitter is able to reflect red color light of both s- and p-polarizations.

5. An optical system as claimed in claim 1 or 2 wherein the said dichroic beam splitter is able to reflect blue color light of both s- and p-polarizations.

6. An optical system as claimed in claim 1 or 2 wherein the said reflective liquid crystal light valves comprise active matrix silicon backplane microdisplays.

7. An optical system as claimed in claim 1 wherein the said green band of light in claim 1 is further filtered by a green filter to enhance the color purity of the green light and to balance the colors of different channels.

8. An optical system for projecting an image comprising,

a.) a light source providing a near collimated beam of light,

b.) means for converting most of said light into polarized light,

c.) means for rotating the polarization direction of a band of green light of the said polarized light by 90° while leaving the polarization direction of the red and blue lights unchanged, and keeping the propagation directions of all the lights the same,

d.) a polarizing beam splitter that separates the said green band of light from the rest of the light which is magenta in color into two orthogonal directions, having as well orthogonal polarization directions,

e.) two reflective liquid crystal light valves that reflect respectively green and magenta colored lights, and

f.) a projection lens means for projecting the combined magenta and green lights onto a screen.

9. An optical system as claimed in claim 8 wherein the said polarizing beam splitter comprises a polarizing cube with a coating designed at 45° angle of incidence that transmits p-polarized light and reflects s-polarized light.

10. An optical system as claimed in claim 8 wherein the said reflective liquid crystal light valve comprises an active matrix silicon backplane microdisplay.

11. An optical system as claimed in claim 8 wherein the said magenta reflective liquid crystal light valve is partitioned into pixels, with red and blue color filters covering alternating pixels, which are electronically controlled independently to produce images in red and blue colors separately.

12. An optical system as claimed in claim 11 wherein the partitioning is in the form of alternating tiles, with alternating tiles being in red and in blue colors.

13. An optical system as claimed in claim 11 wherein the partitioning of the pixels is in the form of alternating strips, with alternating strips being in red and in blue colors.

14. An optical system as claimed in claim 11 wherein the color filters in the magenta liquid crystal light valve are fabricated onto the active matrix backplane directly.

15. An optical system as claimed in claim 11 wherein the color filters in the magenta liquid crystal light valve are fabricated on the counter glass opposite to the active matrix backplane forming the light valve.

16. An optical system as claimed in claim 8 wherein the green light is further filtered by a green filter to enhance its color purity.

17. An optical system for projecting an image comprising,

a.) a light source providing a near collimated beam of light,

b.) means for converting most of said light into polarized light,

c.) means for rotating the polarization direction of a band of red light of the said polarized light by 90° while leaving the polarization direction of the green and blue lights unchanged, and keeping the propagation directions of all the lights the same,

d.) a polarizing beam splitter that separates the said red band of light from the rest of the light which is cyan in color into two orthogonal directions, having as well orthogonal polarization directions,

e.) two reflective liquid crystal light valves that reflect respectively red and cyan colored lights, and

f.) a projection lens means for projecting the combined cyan and red lights onto a screen.

18. An optical system as claimed in claim 17 wherein the said polarizing beam splitter comprises a polarizing cube with a coating designed at 45° angle of incidence that transmits p-polarized light and reflects s-polarized light.

19. An optical system as claimed in claim 17 wherein the said reflective liquid crystal light valve comprises an active matrix silicon backplane microdisplay.

20. An optical system as claimed in claim 17 wherein the said cyan reflective liquid crystal light valve is partitioned into pixels, with green and blue color filters covering alternating pixels, which are electronically controlled independently to produce images in green and blue colors separately.

21. An optical system as claimed in claim 20 wherein the partitioning of the pixels in the cyan liquid crystal light valve is in the form of alternating tiles, with alternating tiles being in green and in blue colors.

22. An optical system as claimed in claim 20 wherein the partitioning of the pixels in the cyan liquid crystal light valve is in the form of alternating strips, with alternating strips being in green and in blue colors.

23. An optical system as claimed in claim 20 wherein the color filters in the cyan liquid crystal light valve are fabricated onto the active matrix backplane directly.

24. An optical system as claimed in claim 20 wherein the color filters in the cyan liquid crystal light valve are fabricated on the counter glass opposite to the active matrix backplane forming the light valve.

25. An optical system as claimed in claim 17 wherein the red light is further filtered by a red filter to enhance its color purity.

26. An optical system for projecting an image comprising,

a.) a light source providing a near collimated beam of light,

b.) means for converting most of said light into polarized light,

c.) means for rotating the polarization direction of a band of blue light of the said polarized light by 90° while leaving the polarization direction of the red and green lights unchanged, and keeping the propagation directions of all the lights the same,

d.) a polarizing beam splitter that separates the said blue band of light from the rest of the light which is yellow in color into two orthogonal directions, having as well orthogonal polarization directions,

e.) two reflective liquid crystal light valves that reflect respectively blue and yellow colored lights, and

f.) a projection lens means for projecting the combined yellow and blue lights onto a screen.

27. An optical system as claimed in claim 26 wherein the said polarizing beam splitter comprises a polarizing cube with a coating designed at 45° angle of incidence that transmits p-polarized light and reflects s-polarized light.

28. An optical system as claimed in claim 26 wherein the said reflective liquid crystal light valve comprises an active matrix silicon backplane microdisplay.

29. An optical system as claimed in claim 26 wherein the said yellow reflective liquid crystal light valve is partitioned into pixels, with red and green color filters

covering alternating pixels, which are electronically controlled independently to produce images in red and green colors separately.

30. An optical system as claimed in claim 29 wherein the partitioning of the pixels in the yellow liquid crystal light valve is in the form of alternating tiles, with alternating tiles being in red and in green colors.

31. An optical system as claimed in claim 29 wherein the partitioning of the pixels in the yellow liquid crystal light valve is in the form of alternating strips, with alternating strips being in red and in green colors.

32. An optical system as claimed in claim 29 wherein the color filters in the yellow liquid crystal light valve are fabricated onto the active matrix backplane directly.

33. An optical system as claimed in claim 29 wherein the color filters in the yellow liquid crystal light valve are fabricated on the counter glass opposite to the active matrix backplane forming the light valve.

34. An optical system as claimed in claim 29 wherein the blue light is further filtered by a blue filter to enhance its color purity.

35. An optical system for projecting an image comprising,

a.) a light source providing a near collimated beam of light,

b.) a polarizing beam splitter that separates the incident light into two orthogonal directions, having orthogonal polarization directions,

c.) a green band pass optical filter that passes only green light placed along one of the separated beams,

d.) a magenta pass filter that passes blue and red light placed along the other separated beam,

e.) a polarization independent dichroic beam splitter that separates the said magenta light further into a blue and a red beam of light that propagate in two orthogonal directions,

f.) three reflective liquid crystal light valves that reflect respectively red, green and blue lights, thus forming separately red, green and blue images, and

g.) a projection lens means for projecting the combined red, green and blue lights onto a screen.

36. An optical system as claimed in claim 35 wherein the said polarizing beam splitter comprises a polarizing cube with a coating designed at 45° angle of incidence that transmits p-polarized light and reflects s-polarized light.

37. An optical system as claimed in claim 35 wherein the said dichroic beam splitter is designed for 45° angle of incidence.

38. An optical system as claimed in claim 35 wherein the said dichroic beam splitter is able to reflect or transmit red color light of both s- and p-polarizations.

39. An optical system as claimed in claim 35 wherein the said dichroic beam splitter is able to reflect or transmit blue color light of both s- and p-polarizations.

40. An optical system as claimed in claim 35 wherein the said reflective liquid crystal light valves are active matrix silicon backplane microdisplays.

41. An optical system for projecting an image comprising,

a.) a light source providing a near collimated beam of light,

b.) a polarizing beam splitter that separates the incident light into two orthogonal directions, having orthogonal polarization directions,

c.) a green band pass optical filter that passes only green light placed along one of the separated beams,

d.) two reflective liquid crystal light valves that reflect respectively green and magenta lights, and

e.) a projection lens means for projecting the combined green and magenta lights onto a screen.

42. An optical system as claimed in claim 41 wherein the said polarizing beam splitter comprises a polarizing cube with a coating designed at 45° angle of incidence that transmits p-polarized light and reflects s-polarized light.

43. An optical system as claimed in claim 41 wherein a magenta pass filter that passes blue and red light is placed along the other separated beam.

44. An optical system as claimed in claim 41 wherein the said reflective liquid crystal light valves comprise active matrix silicon backplane microdisplays.

45. An optical system as claimed in claim 41 wherein the said magenta reflective liquid crystal light valve is partitioned into pixels, with red and blue color filters built onto alternating pixels which are electronically controlled independently to produce images in red and blue colors separately.

46. An optical system as claimed in claim 45 wherein the partitioning of the pixels in the magenta liquid crystal light valve is in the form of alternating tiles, with alternating tiles being in red and in blue colors.

47. An optical system as claimed in claim 45 wherein the partitioning of the pixels in the magenta liquid crystal light valve is in the form of alternating strips, with alternating strips being in red and in blue colors.

48. An optical system as claimed in claim 47 wherein the color filters in the magenta liquid crystal light valve are fabricated onto the active matrix backplane directly.

49. An optical system as claimed in claim 45 wherein the color filters in the magenta liquid crystal light valve are fabricated on the counter glass opposite to the active matrix backplane forming the light valve.

50. An optical system for projecting an image comprising,

a.) a light source providing a near collimated beam of light,

b.) a polarizing beam splitter that separates the incident into two orthogonal directions, having orthogonal polarization directions,

c.) a red band pass optical filter that passes only red light placed along one of the separated beams,

d.) two reflective liquid crystal light valves that reflect respectively red and cyan lights, and

e.) a projection lens means for projecting the combined the reflected red and cyan lights onto a screen.

51. An optical system as claimed in claim 50 wherein the said polarizing beam splitter comprises a polarizing cube with a coating designed at 45° angle of incidence that transmits p-polarized light and reflects s-polarized light.

52. An optical system as claimed in claim 50 wherein a cyan pass filter that passes blue and green light can be placed along the other separated beam.

53. An optical system as claimed in claim 50 wherein the said reflective liquid crystal light valves comprise active matrix silicon backplane microdisplays.

54. An optical system as claimed in claim 50 wherein the said cyan reflective liquid crystal light valve is partitioned into pixels, with green and blue color filters built onto alternating pixels which are electronically controlled independently to produce images in green and blue colors separately.

55. An optical system as claimed in claim 54 wherein the partitioning of the pixels in the cyan liquid crystal light valve is in the form of alternating tiles, with alternating tiles being in green and in blue colors.

56. An optical system as claimed in claim 54 wherein the partitioning of the pixels in the magenta liquid crystal light valve is in the form of alternating strips, with alternating strips being in green and in blue colors.

57. An optical system as claimed in claim 54 wherein the color filters in the cyan liquid crystal light valve are fabricated onto the active matrix backplane directly.

58. An optical system as claimed in claim 54 wherein the color filters in the cyan liquid crystal light valve are fabricated on the counter glass opposite to the active matrix backplane forming the light valve.

59. An optical system for projecting an image comprising,

a.) a light source providing a near collimated beam of light,

b.) a polarizing beam splitter that separates the incident into two orthogonal directions, having orthogonal polarization directions,

c.) a blue band pass optical filter that passes only blue light placed along one of the separated beams,

d.) two reflective liquid crystal light valves that reflect respectively blue and yellow light, and

e.) a projection lens means for projecting the combined yellow and blue reflected light onto a screen.

60. An optical system as claimed in claim 59 wherein the said polarizing beam splitter comprises a polarizing cube with a coating designed at 45° angle of incidence that transmits p-polarized light and reflects s-polarized light.

61. An optical system as claimed in claim 59 wherein a yellow pass filter that passes green and red light can be placed along the other separated beam.

62. An optical system as claimed in claim 59 wherein the said reflective liquid crystal light valves comprise active matrix silicon backplane microdisplays.

63. An optical system as claimed in claim 59 wherein the said yellow reflective liquid crystal light valve is partitioned into pixels, with red and green color filters built onto alternating pixels which are electronically controlled independently to produce images in red and green colors separately.

64. An optical system as claimed in claim 62 wherein the partitioning of the pixels in the yellow liquid crystal light valve is in the form of alternating tiles, with alternating tiles being in red and in green colors.

65. An optical system as claimed in claim 63 wherein the partitioning of the pixels in the yellow liquid crystal light valve is in the form of alternating strips, with alternating strips being in red and in green colors.

66. An optical system as claimed in claim 63 wherein the color filters in the yellow liquid crystal light valve are fabricated onto the active matrix backplane directly.

67. An optical system as claimed in claim 63 wherein the color filters in the yellow liquid crystal light valve are fabricated on the counter glass opposite to the active matrix backplane forming the light valve.

68. An optical system for projecting an image comprising,

a.) a light source providing a near collimated beam of light,

b.) a means of converting most of said light into polarized light

c.) a polarizing beam splitter,

d.) a reflective liquid crystal light valve constructed with an array of pixels which are covered with color filter coatings arranged in a mosaic of red, green and blue colors, and

e.) a projection lens means for projecting the image formed on the said liquid crystal light valve onto a screen.

69. An optical system as claimed in claim 68 wherein the said liquid crystal light valve comprises a silicon microdisplay.